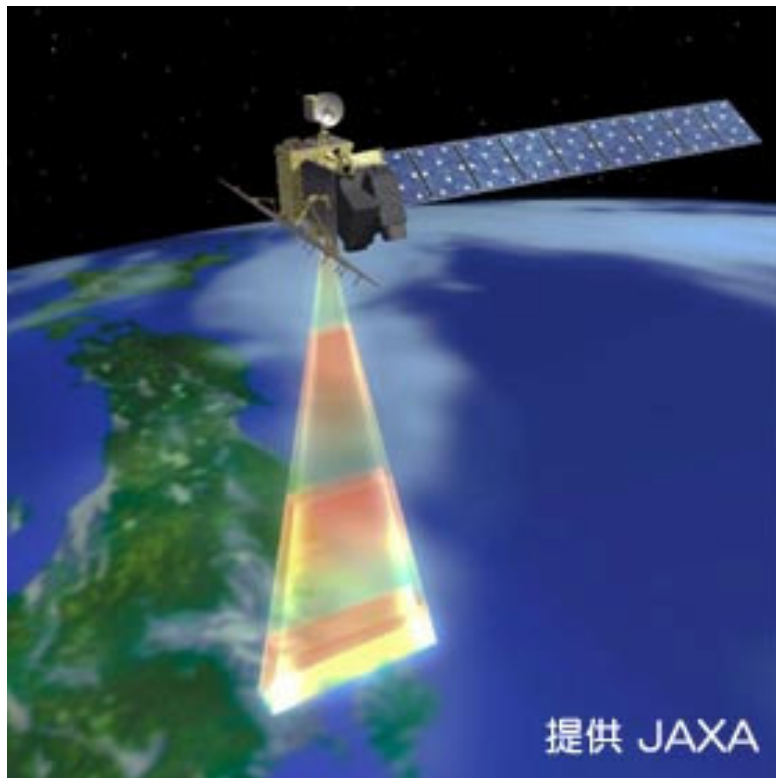


ADEN ALOS AVNIR-2 CYCLIC REPORT
CYCLIC REPORT #19
24 APRIL 2008 TO 09 JUNE 2008



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AVNIR-2 CYCLIC REPORT # 19

1 INTRODUCTION

The AVNIR-2 Cyclic Report is distributed by the ADEN AVNIR-2 QC team to keep the AVNIR-2 community informed of any modifications regarding quality control, instrument performance, the data production chain and the results of calibration and validation campaigns at the end of each ALOS cycle, which represents 671 orbits, or 46 days.

The AVNIR-2 instrument is part of the Japanese JAXA ALOS mission and its products are received and processed via ESA's ADEN ground segment across Europe. This is done through an agreement between JAXA and ESA, where ALOS is classed as an ESA Third Party Mission, for which it is responsible for data reception and product dissemination across the European and African regions. A series of quality checks are undertaken in order to assess the ground segment, the instrument performance and the product quality.

Checks are currently made on a weekly (header parameters, PDS status) or bi-monthly (visual report) basis to have a constant view on the mission status. The cyclic report presents the results of the analysis for the different part of the chain, from satellite to end-product.

This document is available online at:
<http://earth.esa.int/pcs/alos/avnir/reports/cyclic/>

1.1 *Acronyms and Abbreviations*

ADEN	ALOS Data European Node
ALOS	Advanced Land Observing Satellite
AVNIR-2	Advanced Visible and Near Infra-red Radiometer Type-2
CEOS	Committee on Earth Observation Satellites
EO Help	Earth Observation Help Desk
GCP	Ground Control Points
JAXA	Japan Aerospace Exploration Agency
OCM	Orbit Control Manoeuvre
PCS	Product Control Service
PDS	Payload Data Segment
PI	Principal Investigator
QC	Quality Control
SPPA	Sensor Performance Products Algorithms
TOA	Top of Atmosphere

1.2 Reference Documents

- | | |
|------|--|
| RD.1 | ALOS/AVNIR-2 Level 1 product format description Rev J - October, 2006 JAXA (NEB 00016) |
| RD.2 | Bouvet M., Goryl. P., Santer R., Chander G., Saunier S, Preliminary radiometric calibration assessment of ALOS AVNIR-2 IGARSS 2007 proceedings |
| RD.3 | Saunier S., Goryl. P et al, The contribution of ESA to the ALOS PRISM / AVNIR-2 commissioning phase IGARSS 2007 proceedings |
| RD.4 | Saunier S., Goryl P, Final calibration / Validation report AVNIR-2 Instrument Issue 1 Rev 0 – July 2007 |

1.3 Background information

The AVNIR-2 instrument is an optical instrument part of the ALOS mission built by the Japanese Space Agency (JAXA).

The ALOS mission has its data produced and disseminated through geographical nodes. The European node (ADEN) was set up and is operated by ESA through the Tromso, Matera, Mas Palomas and Frascati ground stations. As a third party mission (TPM), only the ground segment and data processing are dealt with by ESA, the platform being the responsibility of the owner: JAXA. Each node operates their ground segment independently and shares results with JAXA when required.

The ADEN-ALOS team is responsible for the operation and maintenance of the data received in Europe and North Africa. The ADEN team took part in the Cal/Val activities during the ALOS commissioning phase (January to October 2006). The methodologies used and results obtained are documented (RD.3 and RD.4) and made available to the user through the site: <http://earth.esa.int/object/index.cfm?fobjectid=3738>

As part of the ADEN operations, a series of quality checks are undertaken in order to assess the ground segment and instrument performance and the product quality for products requested by European users. Checks are currently made on a weekly basis (header parameters, PDS status) to have a constant view on the mission status.

2 SUMMARY

Cyclic Report: 19

Cycle Start: 24 April 2008

Cycle End: 09 June 2008

The main issues during the cycle have been as follows:

- **Processor Version**

Current AVNIR-2 processor version: 4.05

See Section 3 for more information

3 SOFTWARE & AUX FILE VERSION CONFIGURATION

Current Optical Processor Version	ESRIN	Matera	Tromso
4.05	09/01/08		
4.04		05/10/07	
3.00			20/08/07

Table 3-1 Optical Processing Versions

The reason for this particular configuration of processor versions as listed in Table 3-1 is that the release of the v4.02 of the optical processor solved a number of problems with the previously installed v3.00. However the PRISM components of the processor experienced some issues with the newer version, and therefore, v3.00 was maintained at Tromso, while the updated version was installed at Matera and ESRIN. Subsequently, v4.02 has been upgraded to 4.04 in both ESRIN and Matera, but v3.00 is still maintained at Tromso.

Please note that there is a discrepancy between the optical processor version number within the product header and work report, and that reported by the ADEN operations team. This issue is currently being investigated, and will be clarified in future reports.

A history of the ADEN optical processor release notes will be made available on the ALOS ADEN PCS website, location: <http://earth.esa.int/pcs/alos/avnir/userinfo/>

ALOS Precision Attitude Data was updated by JAXA to improve accuracy. Announced 02/05/08 Implemented 07/05/08.

4 PDS STATUS

4.1 *Planned Instrument Unavailability*

None reported during this cycle.

4.2 *Unplanned Instrument Unavailability*

None reported during this cycle.

4.3 *Current Platform Status*

Information on the platform provided by JAXA:

Current platform status: Normal

JAXA information reported on in this document cover the period 01/04/2008 to 31/05/2008

4.4 *ADEN PDS Unavailability*

None reported during this cycle.

4.5 *Periods of missing precision orbit data*

For the periods described in Table 4-1, JAXA has announced that precision orbit data is missing.

From (UT)		To (UT)		Reason
Date	Time	Date	Time	
Apr. 26, 2008	10:20:00	Apr. 26, 2008	11:23:00	Due to OCM
May 16, 2008	20:36:00	May. 16, 2008	21:40:00	Due to OCM

Table 4-1 Missing Precision Orbit Data

4.6 *Periods of missing precision attitude data*

For the periods described in Table 4-2, JAXA has announced that precision attitude data is missing.

From (UT)		To (UT)		Reason
Date	Time	Date	Time	
May. 11, 2008	00:30:00	May. 11, 2008	03:00:00 ¹	Star Tracker Calibration

Table 4-2 Missing Precision Attitude Data

4.7 Periods lacking Yaw steering

For the periods described in Table 4-3, JAXA has announced that Yaw steering was not available.

From (UT)		To (UT)		Reason
Date	Time	Date	Time	
May 10, 2008	23:55:00	May. 11, 2008	09:10:00	Star Tracker Calibration
May. 13, 2008	00:00:00	May. 13, 2008	23:59:00	Star Tracker Calibration

Table 4-3 No Yaw steering

4.8 JAXA Observation Strategy

The JAXA observation strategy can be found:

<http://www.eorc.jaxa.jp/ALOS/obs/overview.htm>

¹ Tentative schedule, detail of exact times has not yet been confirmed.

5 DATA QUALITY CONTROL

5.1 *Instrument Related Anomalies*

No reported anomalies this cycle.

5.2 *Processor Related Anomalies*

No reported anomalies this cycle.

5.3 *Daily Report Issues*

During the past cycle, daily checks have been undertaken on all AVNIR-2 products generated by ADEN and electronically disseminated. Checks are currently conducted on a weekly basis due to current data volumes.

Browse products for all optical images are visually inspected and reported on in each daily report.

54 products have been examined during the course of this cycle, and no issues have arisen from the checks.

5.4 *Visual Inspection Report Issues*

Image quality analysis continued throughout this cycle in the form of Visual Anomaly Reports by the ADEN QC Optical operations team.

There were no image anomalies detected that have not already been documented in the JAXA document that details common expected visual issues:

<http://www.eorc.jaxa.jp/en/about/distribution/info/alos/characteristics.html>

5.5 *User Queries*

An AVNIR-2 FAQ containing common user requests can be found on the ESA PCS website.

The link to this site is: <http://earth.esa.int/pcs/alos/avnir/userinfo/>

5.6 *Product Performance Monitoring*

This information will be reported on in future cyclic reports.

6 CALIBRATION/VALIDATION ACTIVITIES & RESULTS

This information will be reported on in future cyclic reports.

6.1 *Vicarious Calibration*

This information will be reported on in future cyclic reports.

6.2 *Sensor Inter Comparison*

This information will be reported on in future cyclic reports.

7 DISCLAIMERS

No new disclaimers have been issued during this cycle.

A list of known product errors caused by image processing algorithm errors is listed on the JAXA site at:

http://www.eorc.jaxa.jp/hatoyama/satellite/data_tekyo_setsumei/alos_renraku_e.html

8 EVENTS

The following section details events that may be of interest to ALOS data users.

- The second ALOS PI Symposium will be taking place from the 3rd to the 7th of November in Rhodes, Greece. For more information, please see <http://earth.esa.int/ALOS2008>.
 - Note that the deadline for abstract submission was June 15 2008.
- The submission of request files for ALOS simulation number 10 was due by 20th June 2008.

8.1 *Past Events:*

- The submission of request files for ALOS simulation number 9 was due by March 21, 2008
- The ALOS PCS Site is now available at: <http://earth.esa.int/pcs/alos/>
- ALOS simulation #8 for Cycle 18-21
 - The results of the second stage simulation were made available by JAXA on Feb.4th.
 - The Analysis Report on ALOS simulation #8 was delivered by JAXA on Feb.12th.
- 29 January 2008: Users are now able to submit orders for ALOS future acquisitions via EOLI-SA (email eohelp@esa.int for more information)

APPENDIX A DATASET FOR L1B2 PERFORMANCE MONITORING

There was no L1B2 performance monitoring in this report.

APPENDIX B PRODUCT SPECIFICATION AS DETERMINED FROM THE ADEN VERIFICATION PERIOD

Geometric activities performed during data verification period demonstrated that the pointing accuracy improved over time and with processing software updates. The orbit shift in time was been significantly reduced and is now below the pixel. The geo-location accuracy of the 1B2R product reaches 50 metres (RMS). The internal accuracy which reflects the image geometry is evaluated to be around 18 metres (RMS).

Several assessments to compute the inter-band registration have been done; results are agree that the band-to-band registration remains mainly 0.5 pixel.

Radiometric activities performed on stable and invariant test site demonstrated that the radiometric band to band calibration and radiometric calibration remains very stable over one year. In addition, the sensor inter-comparison procedures have been set up and applied to a same dataset. The conclusions of these three methods agree that the radiometric calibration of AVNIR-2 is satisfactory, given the error bar of the methodologies which is estimated to be around 5%.

The product specifications as output from ADEN data verification periods can be summarised as follow:

AVNIR-2	Radiometric accuracy	Geometric accuracy			
Level1B2	Band 1 -5.6% (1 σ) Band 2 -0.1% (1 σ) Band 3 N/A* Band 4 -2.7% (1 σ)	RMS	Pixel (CT)	Line (AT)	Norm
		Nadir*	48 m	10 m	49 m
	Sensor Intercomparison with various EO Sensor (Meris, Landsat ...) as reference (ESA/ESTEC, USGS, LISE) *Not evaluated due to image saturation	Polynomial coefficients embedded within product are used to predict geo location (GAEL). *Acquisition with a 0 pointing degree.			

AVNIR-2 Product specifications, radiometric and geometric accuracy

AVNIR-2		Image Quality	
Level 1B1	MTF@Nyquist	Pixel (CT)	Line (AT)
	Band 1	0.51	0.24
	Band 2	0.50	0.30
	Band 3	0.48	0.32
	Band 4*	N/A	N/A
HR/LR Method (ONERA)			
*Not evaluated due to image saturation			

AVNIR-2 Product specifications, image quality

APPENDIX C INSTRUMENT ANOMALIES

Below is a list of ALOS anomalies that may have an impact on image quality, radiometric calibration or localisation accuracy (from 24th October 2006).

- Calibration operations for Star Tracker conducted on 11th and 13th of May 2008,
- Orbit manoeuvres conducted on 16th May 2008,
- Orbit manoeuvres conducted on 26th April 2008,
- Orbit manoeuvres conducted on 4th April 2008.
- Orbit manoeuvres conducted on 26th January and 2nd, 15th, 29th February 2008.
- YAW steering was suspended on 28th January 2008
- Orbit manoeuvres conducted on 15th December 2007, 4th, 11th & 18th January 2008.
- Observation, yaw steering, and precision attitude system suspended on 31st October 2006 between 03:50 and 15:50 UT due to change AOCS on-board orbit model to that of 15th order.
- Yaw steering suspended during 23rd February 00:12 UT to 24th February 2007 23:01 UT (yaw steering suspended due to calibrating operations for Star Tracker (STT) and Precision Attitude Determination).
- Yaw steering suspended during 22nd March 00:24 UT to 23rd March 2007 23:17 UT (yaw steering suspended due to calibrating operations for Star Tracker (STT) and Precision Attitude Determination).
- Yaw steering on/off switching on 10th April 2007:
Yaw steering on to off: 12:57 – 13:22 UT (data unavailable)
No yaw steering operation: 13:22 – 14:42 UT (data available)
Yaw steering off to on: 14:42 – 15:45 UT (data unavailable)
- Orbit manoeuvres on 25th, 27th and 29th April 2007.
- Orbit manoeuvres on 8th and 22nd June 2007.
- Orbit manoeuvres conducted on 7th and 20th July 2007.
- Yaw steering on/off switching on 31st July 2007:

Switching in progress: 00:00 – 00:30, 21:57 – 22:46 UT (Observation suspended)
No yaw steering observation: 00:30 – 21:57UT (Data available)

- Orbit manoeuvres conducted on 3rd and 25th August 2007.
- Orbit manoeuvres conducted on 6th, 12th and 26th October 2007.
- Orbit manoeuvres conducted on 10th and 23rd November 2007.
- Orbit manoeuvres conducted on 7th and 15th December 2007.
- Orbit manoeuvres conducted on 4th, 11th, 18th and 26th January 2008.
- Orbit manoeuvres conducted on 2nd, 15th and 29th February 2008.
- Orbit manoeuvres conducted on 8th March 2008.